WHAT IS CLAIMED IS:

1. An information recording medium, comprising:

a first substrate;

a second substrate disposed so as to be opposed to the first substrate;

a first information layer disposed between the first substrate and the second substrate;

a second information layer disposed between the first information layer and the second substrate; and

an intermediate layer disposed between the first information layer and the second information layer,

wherein the first information layer includes a first recording layer that is transformed in phase reversibly between a crystal phase and an amorphous phase with a laser beam radiated from the first substrate side,

the second information layer includes a second recording layer that is transformed in phase reversibly between a crystal phase and an amorphous phase with the laser beam, and

the first recording layer contains Ge, Sn, Sb, and Te, and has a thickness of 9 nm or less.

2. An information recording medium according to claim 1, wherein the first recording layer is made of a material represented by a composition formula: $(Ge\text{-}Sn)_A Sb_B Te_{3+A}$, where $2 \leq A \leq 22$ and $2 \leq B \leq 4$.

3. An information recording medium according to claim 2, wherein a content of Sn in the first recording layer is 25 atomic % or less.

4. An information recording medium according to claim 1, wherein a transmittance Tc (%) of the first information layer in a case where the first recording layer is in a crystal phase, and a transmittance Ta (%) of the first information layer in a case where the first recording layer is in an amorphous phase satisfy $40 \leq (Tc + Ta)/2$ with respect to a laser beam having a wavelength in a range of 390 nm to 430 nm.

5. An information recording medium according to claim 4, wherein the transmittance Tc (%) and the transmittance Ta (%) satisfy $0 \leq |Tc - Ta|/Tc \leq 0.15$ with respect to a laser beam having a wavelength in a range of 390 nm to

430 nm.

6. An information recording medium according to claim 1, wherein the first information layer further includes first and second dielectric layers and a first reflective layer, and

the first reflective layer, the second dielectric layer, the first recording layer, and the first dielectric layer are disposed in this order from the intermediate layer side to the first substrate side.

7. An information recording medium according to claim 6, wherein the first information layer further includes a third dielectric layer disposed between the first reflective layer and the intermediate layer.

8. An information recording medium according to claim 7, wherein a refractive index of the third dielectric layer is 2.3 or more with respect to light having a wavelength in a range of 390 nm to 430 nm.

9. An information recording medium according to claim 7, wherein grooves for tracking control are formed on the intermediate layer.

10. An information recording medium according to claim 7, wherein the first information layer further includes an interface layer disposed at at least one interface selected from the group consisting of an interface between the first dielectric layer and the first recording layer, an interface between the first recording layer and the second dielectric layer, an interface between the second dielectric layer and the first reflective layer, and an interface between the first reflective layer and the third dielectric layer.

11. An information recording medium according to claim 6, wherein a thickness of the first reflective layer is in a range of 5 nm to 15 nm.

12. An information recording medium according to claim 6, wherein a thickness of the first substrate is in a range of 10 μm to 700 μm.

13. An information recording medium according to claim 12, wherein grooves for tracking control are formed on the first substrate.

14. An information recording medium according to claim 1, wherein a thickness of the second substrate is in a range of 500 μm to 1300 μm.

15. An information recording medium according to claim 14, wherein grooves for tracking control are formed on the second substrate.

16. An information recording medium according to claim 7, wherein the second information layer further includes fourth and fifth dielectric layers and a second reflective layer, and

the second reflective layer, the fifth dielectric layer, the second recording layer, and the fourth dielectric layer are disposed in this order from the second substrate side to the intermediate layer side.

17. An information recording medium according to claim 16, wherein the second information layer further includes an interface layer disposed at at least one interface selected from the group consisting of an interface between the fourth dielectric layer and the second recording layer, an interface between the second recording layer and the fifth dielectric layer, and an interface between the fifth dielectric layer and the second reflective layer.

18. A method for producing an information recording medium comprising first and second substrates, first and second information layers, and an intermediate layer, the method comprising the processes of:

(a) forming the second information layer on the second substrate;

(b) forming the intermediate layer on the second information layer;

(c) forming the first information layer on the intermediate layer; and

(d) attaching the first substrate onto the first information layer,

wherein the first information layer includes a first recording layer that is transformed in phase reversibly between a crystal phase and an amorphous phase with a laser beam radiated from the first substrate side,

the second information layer includes a second recording layer that is transformed in phase reversibly between a crystal phase and an amorphous phase with the laser beam, and

the process (c) includes the process of forming the first recording layer to a thickness of 9 nm or less, using a base material containing Ge, Sn, Sb, and Te.

19. A method for producing an information recording medium according to claim 18, wherein, in the process (c), the first recording layer is formed by sputtering using sputtering gas containing argon gas or krypton gas.

20. A method for producing an information recording medium according to claim 19, wherein the sputtering gas further contains at least one gas selected from the group consisting of oxygen and nitrogen.

21. A method for producing an information recording medium according to claim 19, wherein the first recording layer is formed at a film-formation speed in a range of 0.1 nm/second to 10 nm/second.

22. A method for producing an information recording medium according to claim 18, wherein, in the process (b), grooves for tracking control are formed on a surface of the intermediate layer.

23. A method for producing an information recording medium according to claim 18, wherein the first information layer further includes a first reflective layer disposed on the intermediate layer side from the first recording layer, and

the process (c) includes the process of forming the first reflective layer to a thickness in a range of 5 nm to 15 nm.

24. A method for recording/reproducing information with respect to an information recording medium by irradiating the information recording medium with a laser beam,

wherein the information recording medium is the information recording medium of claim 1,

the laser beam is incident from the first information layer side of the information recording medium,

in the second information layer of the information recording medium, information is recorded/reproduced with the laser beam transmitted through the first information layer, and

a wavelength of the laser beam is in a range of 390 nm to 430 nm.

25. A method for recording/reproducing information with respect to an information recording medium according to claim 24, wherein a linear velocity

of the information recording medium in recording/reproducing information is in a range of 1 m/second to 50 m/second.

26. A method for recording/reproducing information with respect to an information recording medium according to claim 24, wherein the laser beam is a laser beam condensed by an objective lens with a numerical aperture NA in a range of 0.4 to 1.1.